

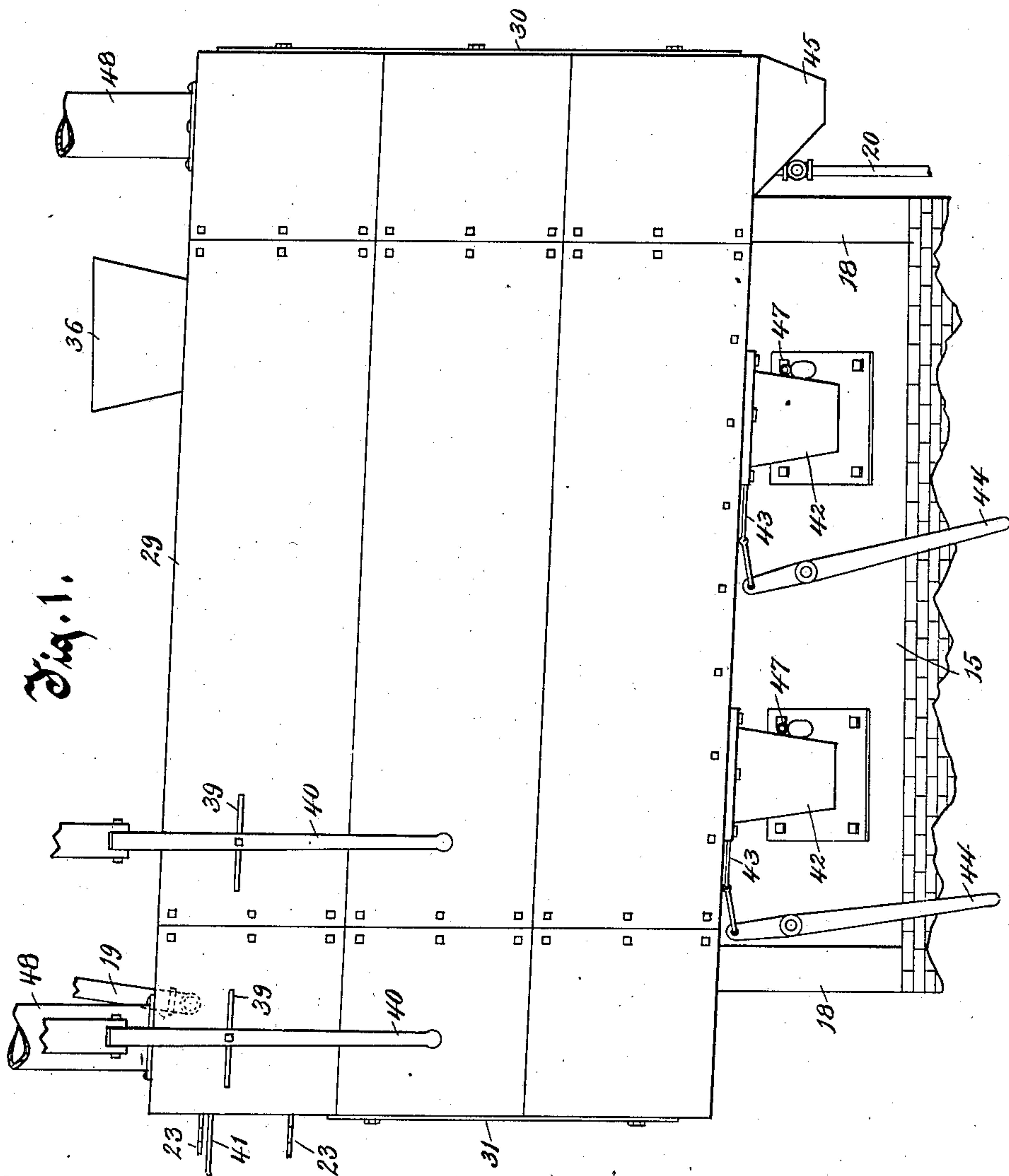
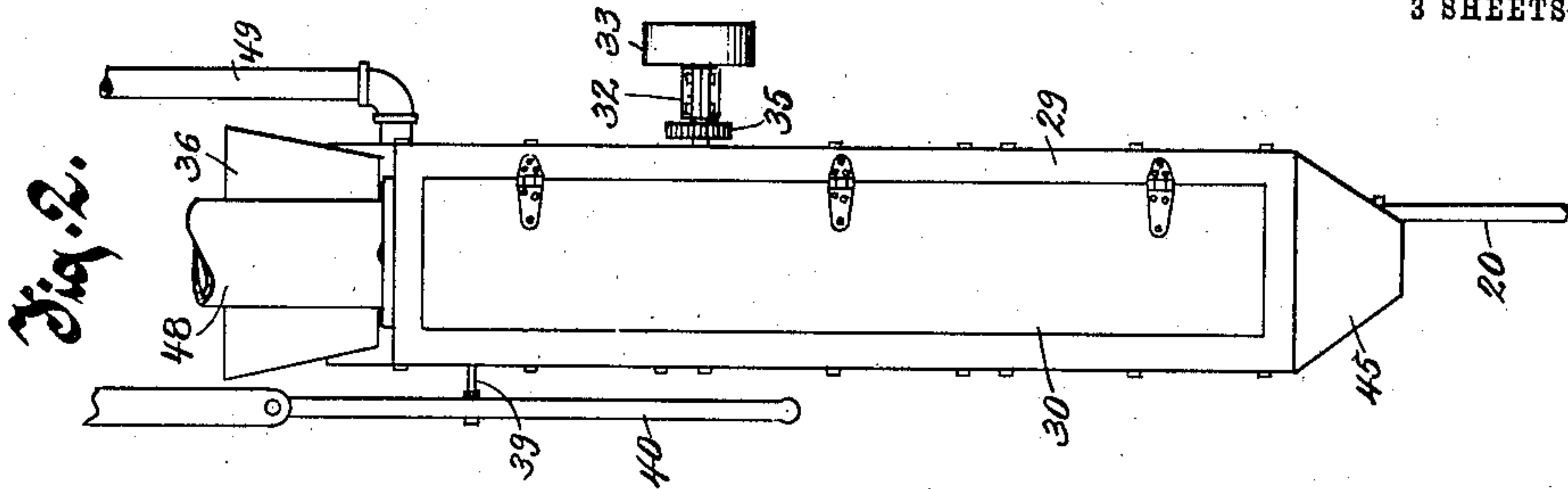
No. 842,916.

PATENTED FEB. 5, 1907.

C. E. SMITH.
SAWDUST DRIER.

APPLICATION FILED JUNE 18, 1906.

3 SHEETS—SHEET 1.



Witnesses:

A. Keeney

Anna F. Schmidtbauer

Inventor:

Charles E. Smith,

By Benedict, Morsell & Caldwell
Attorneys.

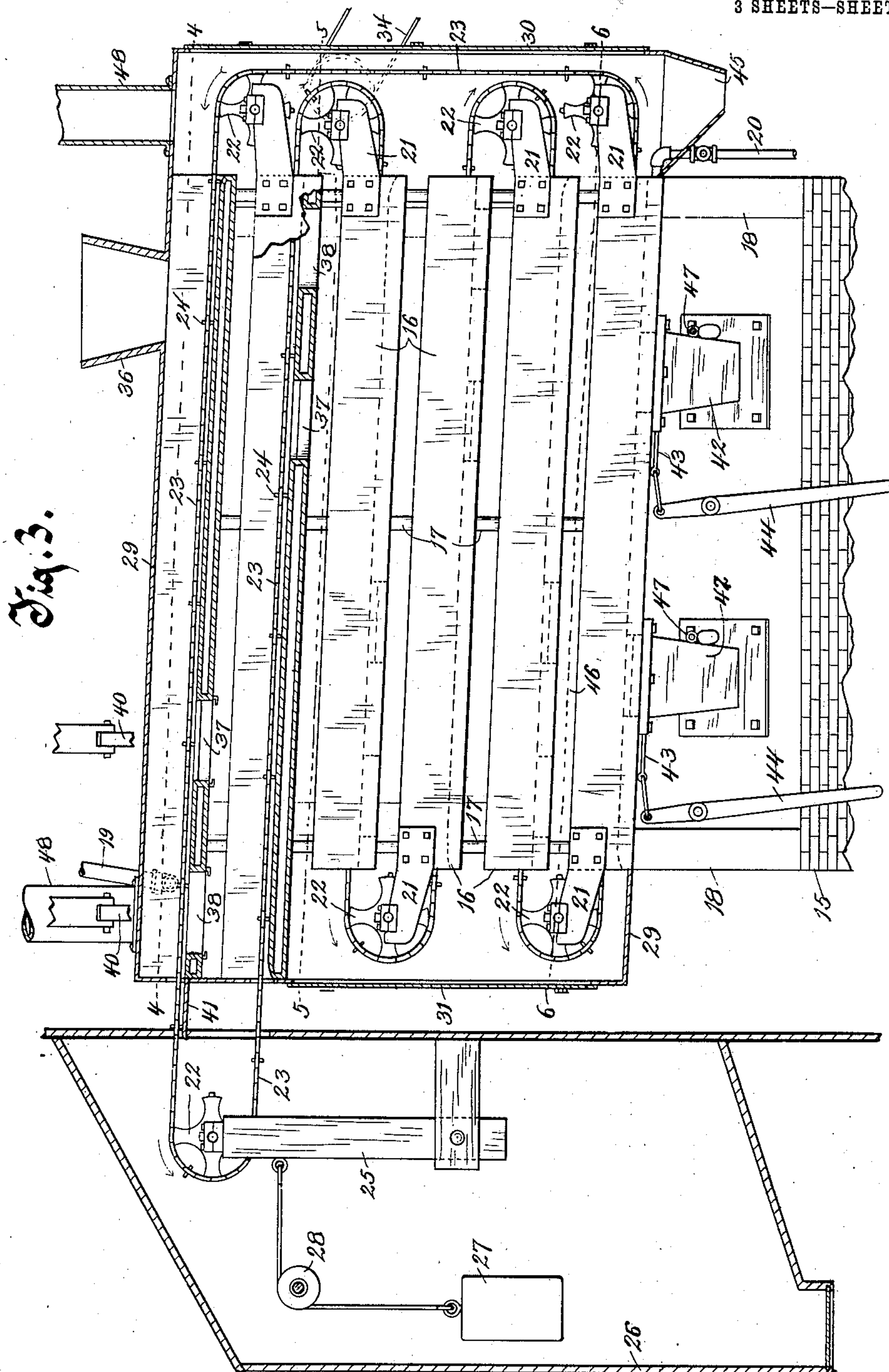
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3 SHEETS—SHEET 2.



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Inventor.
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By Benedict, Morsell & Caldwell
Attorneys.

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3 SHEETS—SHEET 3.

Fig. 4.

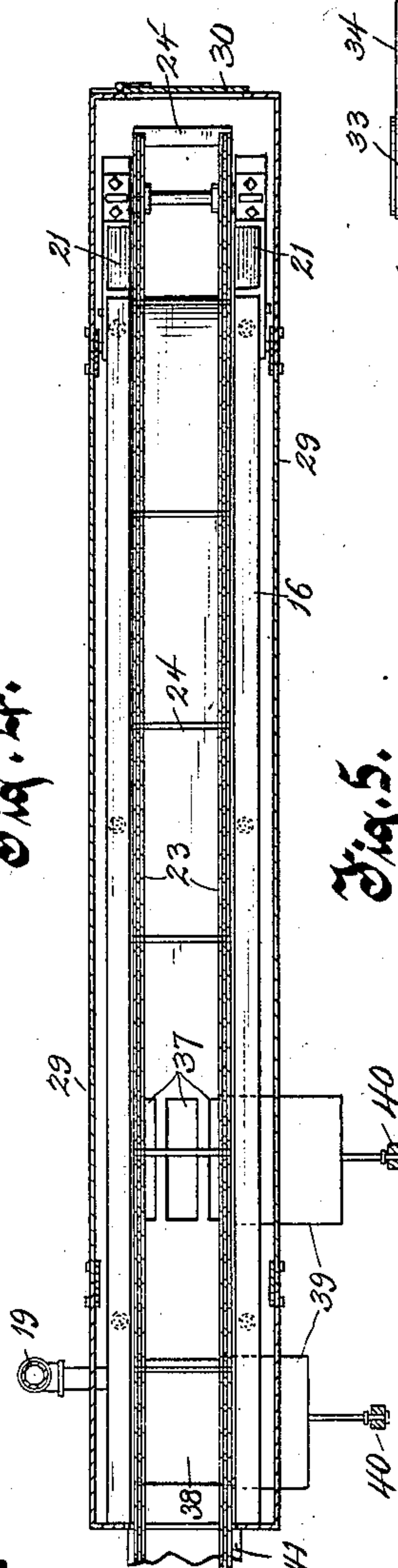


Fig. 5.

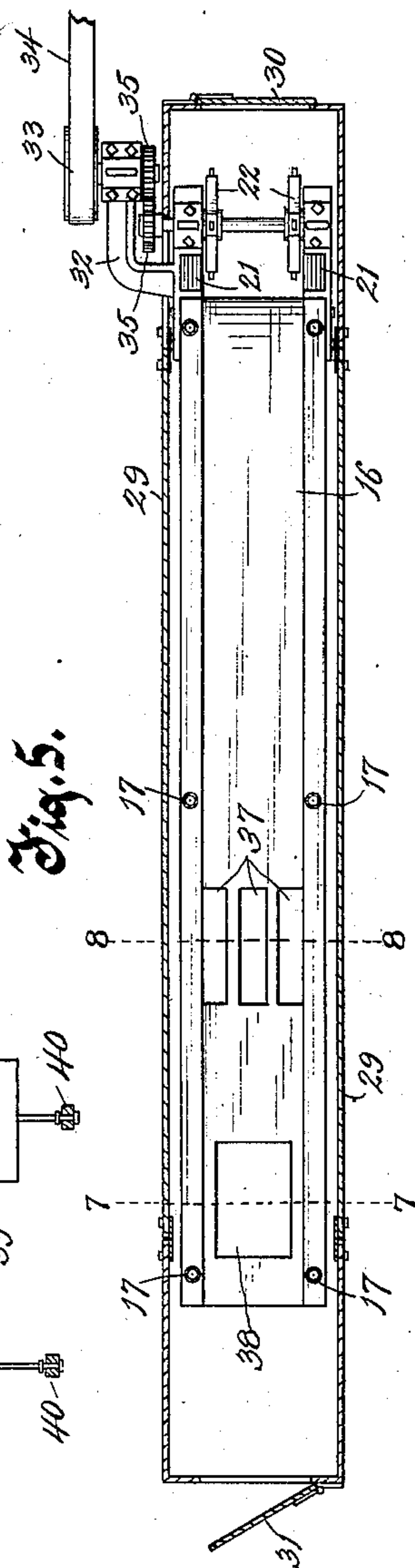


Fig. 6.

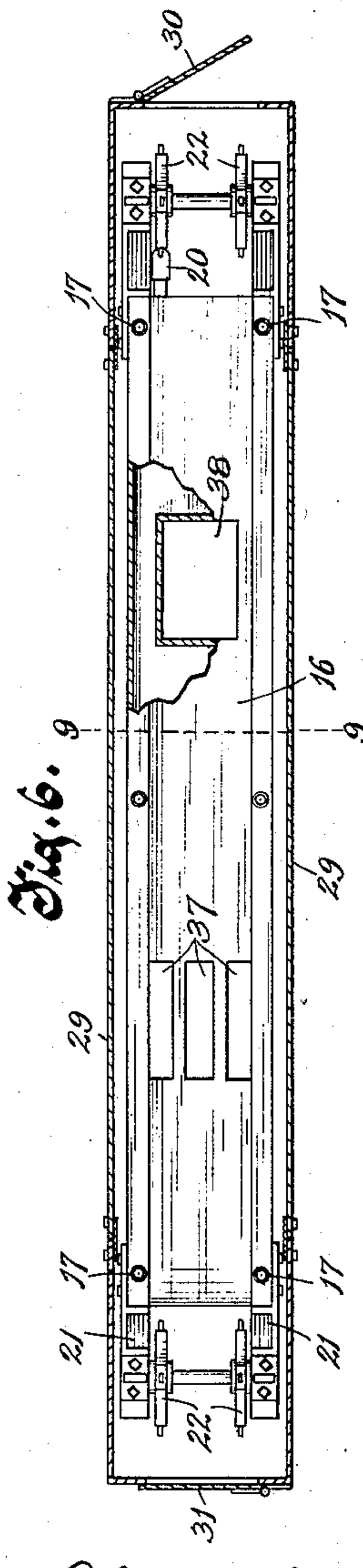


Fig. 7.

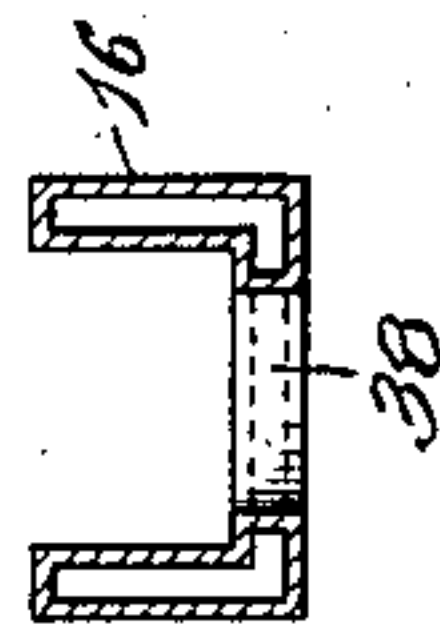


Fig. 8.

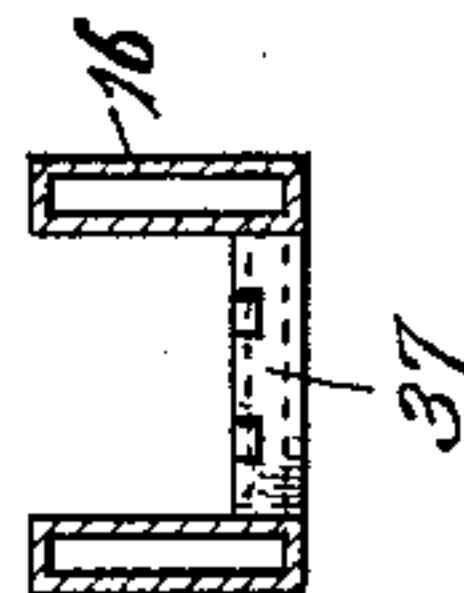


Fig. 9.

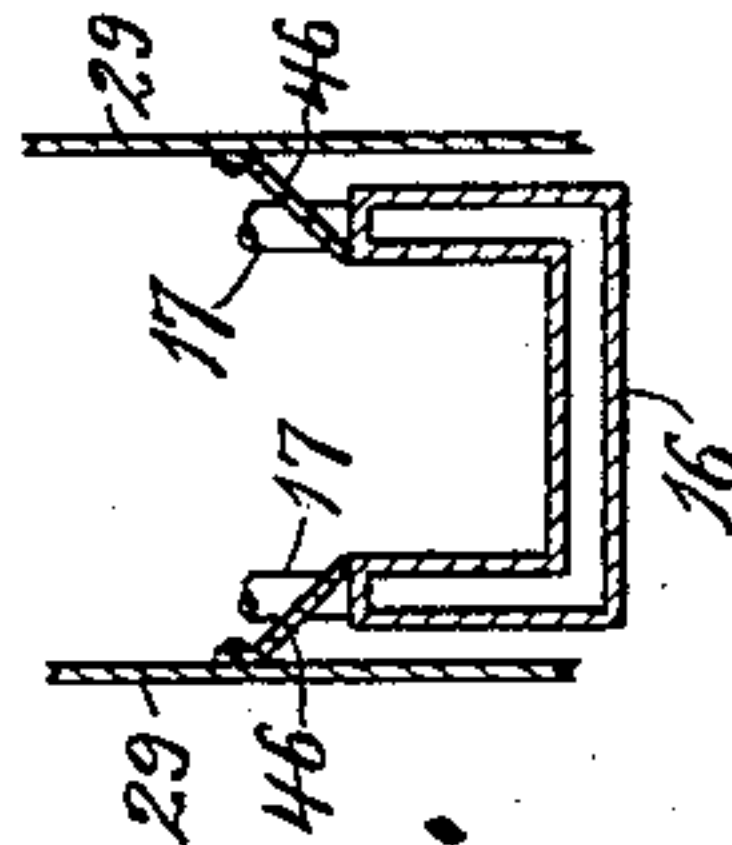
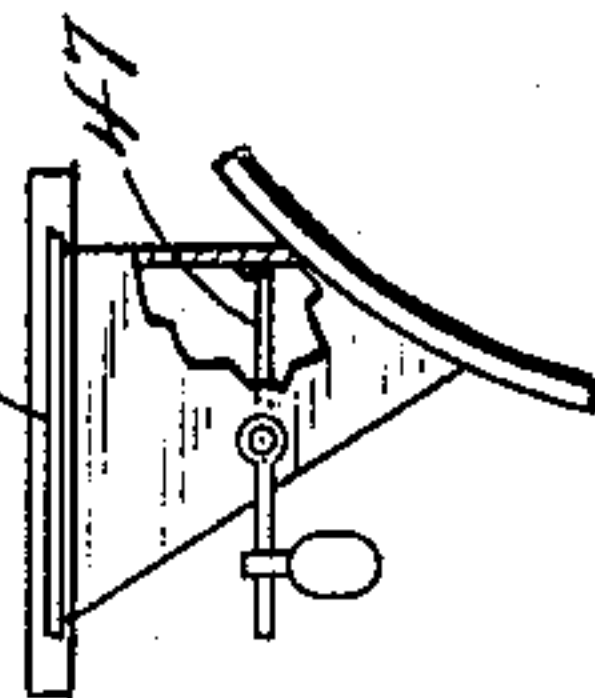


Fig. 10.



Witnesses:

A. H. Carey.
A. W. & Schmidtbauer

Inventor.

Charles E. Smith
By Benedict, Morsell & Caldwell.
Attorneys.

UNITED STATES PATENT OFFICE.

CHARLES E. SMITH, OF MARSHFIELD, WISCONSIN.

SAWDUST-DRIER.

No. 842,916.

Specification of Letters Patent.

Patented Feb. 5, 1907.

Application filed June 18, 1906. Serial No. 322,148.

To all whom it may concern:

Be it known that I, CHARLES E. SMITH, residing in Marshfield, in the county of Wood and State of Wisconsin, have invented new and useful Improvements in Sawdust-Driers, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

This invention has for its object to provide an apparatus for drying sawdust as it is received from a lumber-mill to a condition in which it will freely burn and may be used as fuel in furnaces and the like.

Fresh sawdust direct from a lumber-mill usually contains so much moisture as to be quite unfit for use as a fuel, but if subjected to a drying process it may be used immediately in the boiler-furnaces of the lumber-mill, thus economizing in the cost of running the plant and dispensing with the necessity for storing the sawdust or carting it away.

The sawdust-drier of this invention comprises a series of hollow troughs arranged one above the other and heated by having steam passed through the walls thereof, the sawdust being made to travel slowly through the troughs by means of a slatted conveyer-belt and discharged from one trough to the next by dropping through openings therein until it is finally discharged through valved openings in the last trough to the furnace or other means for receiving it.

With the above and other objects in view the invention further consists in the sawdust-drier, its parts and combinations of parts as herein claimed, and all equivalents.

Referring to the accompanying drawings, in which like characters of reference indicate the same parts in the several views, Figure 1 is a front elevation of a sawdust-drier constructed in accordance with this invention. Fig. 2 is an end elevation thereof. Fig. 3 is a sectional front elevation thereof. Fig. 4 is a sectional plan view taken on the plane of line 4 4 of Fig. 3. Fig. 5 is a similar view taken on the plane of line 5 5 of Fig. 3, the conveyer being removed. Fig. 6 is a similar view on the plane of line 6 6 of Fig. 3. Fig. 7 is a transverse sectional view of one of the troughs, taken on the plane of line 7 7 of Fig. 5. Fig. 8 is a similar view taken on the plane of line 8 8 of Fig. 5. Fig. 9 is a similar view taken on the plane of line 9 9 of Fig. 6; and

Fig. 10 is a side elevation, partly in section, of one of the discharge-spouts.

In the drawings, 15 represents a furnace to which it is desired to feed dry sawdust as a fuel, this furnace as here shown being of the Dutch-oven type, but which may be of any ordinary construction. The drier is located above this furnace and is adapted to discharge the dry sawdust through openings in the top thereof.

A series of troughs 16, U-shaped in cross-section, are arranged one above another and are connected to each other by pipe-sections 17 along their sides, the lowermost trough being mounted on supports 18 on the furnace-wall. The troughs 16 are hollow and preferably of cast-metal construction, and the pipe-sections 17 connect the interior of one trough with the interior of the next trough, so as to form a continuous conductor for the passage of steam. The steam enters the upper trough through a steam-pipe 19 and circulates through all of the troughs, and as they are slightly inclined the water of condensation of each trough will run therefrom and through the pipe-sections 17 to a valved drain-pipe in the lower end of the bottom trough, where it may be drawn off.

Bracket-bearings 21 project from the ends of the troughs and have sprocket-wheels 22 journaled in them for guiding a conveyer-belt 23 through the several troughs successively. The conveyer-belt comprises a pair of sprocket-chains connected at intervals by slats 24, which scrape along the bottoms of the troughs and serve to carry the sawdust along with them through the troughs. One of the sprocket-wheels 22 is mounted on a lever 25, which is pivotally supported in a bin 26, and is connected with a weight 27 by a rope or chain passing over a pulley 28, so that this sprocket-wheel is given a tendency to move in a direction to keep the conveyer-belt tight. The course of the conveyer-belt is indicated by arrows at the several sprocket-wheels and passes from right to left through one trough and from left to right through the succeeding trough, the end of the trough at which the belt enters being rounded to prevent its catching against the slats of the belt.

The series of troughs is inclosed in a sheet-metal casing 29, which is formed with re-

movable sections at the sides and has hinged doors 30 and 31 at its respective ends, by means of which the parts may be accessible for cleaning or repairing.

5 An arm extension 32 of one of the bracket-bearings 21 projects through the casing and forms a bearing for a shaft carrying a drive-pulley 33, which is driven by a belt 34, from any suitable source of power, this shaft being
10 connected by gears 35 with the shaft of one set of sprocket-wheels 22. In this manner the conveyer-belt is given motion.

At the top of the casing is provided a hopper 36 to receive the fresh sawdust as it is
15 removed from the lumber-mill, preferably in a continuous supply. The sawdust is deposited in the uppermost trough near one end thereof and is carried along the trough by means of the slats on the moving conveyer-belt until it reaches a grated opening 37 near
20 the other end of the trough, through which a part of the sawdust drops into the trough beneath, the remainder passing on in the first trough to another opening 38 in the bottom thereof, which does not extend entirely
25 across the trough, leaving a ledge at each side to prevent the conveyer-belt sagging or engaging with the wall of the opening. Through this opening more of the sawdust drops into the trough beneath, but these two
30 openings are provided with slide-valves 39, operated by levers 40 to control the amount of sawdust which is allowed to drop through the openings 37 and 38, the surplus being
35 carried on by the conveyer-belt through an opening in the end of the casing and along a projecting shelf 41 to the bin 26, into which it drops to be stored until required. The sawdust which drops through the openings
40 37 and 38 of the first trough into one end of the second trough is carried along by the conveyer-belt moving in the opposite direction to what it did before until it reaches similar openings 37 and 38 near the other end
45 thereof. The sawdust drops through these openings into the next trough, and this operation is repeated until the last trough is reached, where the openings 37 and 38 are more centrally located and are connected
50 with discharge-spouts 42, leading to the furnace. The openings of the last trough are controlled by slide-valves 43, operated by levers 44, to determine the feed of sawdust to the furnace. The sawdust which is not
55 discharged through the openings 37 and 38 of the last trough is carried on through said trough and discharged at the end thereof into a hopper 45 at the end of the furnace, where it may be fed by hand through the
60 furnace-door when desired. Such sawdust as may be carried beyond the openings in any of the other troughs is similarly discharged into said hopper at one end or into an end chamber at the other end, which is

formed by making the lower troughs slightly 65 shorter than the upper two, primarily for accommodating the sprocket-wheels at that end within the casing. Sawdust which may be deposited at the upper end of the casing cannot accumulate to any great extent, as
70 the slats of the conveyer-belt will engage it and carry it along the lower trough to be discharged with the other sawdust. Along the upper edge of the lower trough the side walls of the casing are provided with inclined de-
75 flecting-plates 46, as shown in Fig. 9, which prevent sawdust passing around this trough.

In order that there may be no communication between the furnace and the sawdust-drier when the latter is not in operation, the
80 discharge-spouts 42 are provided with weighted valves 47, which remain closed, as shown in Fig. 10, except when sawdust is delivered thereto, the weight of the sawdust serving to open the valves during the operation of the
85 sawdust-drier. By this means the danger of fire communication between the furnace and the sawdust-drier is avoided.

The top of the casing at each end is provided with a ventilator-pipe 48 to carry off
90 the warm moist air from the drier, fresh air being admitted through the various openings of the casing.

In operation sawdust is delivered to the hopper 36 at the top of the drier and falls into
95 the top trough to be carried therethrough by the conveyer-belt and discharged into the next trough through the openings 37 and 38, according to the condition of the valves 39, the surplus passing out into the storage-bin
100 26. The sawdust is conveyed through the several troughs successively in the same manner, being heated throughout its course by the walls of the troughs, which are kept hot by the steam passing through their interior,
105 and finally when the sawdust is discharged through the spouts 42 into the furnace it is dried to such an extent as to render it suitable for use as fuel. The moist air is promptly removed from the drying-chamber by means of the ventilating-pipes 48,
110 and the heating-troughs are so surrounded by the casing as to avoid the waste of heat.

The casing being formed in removable sections enables all parts to be readily accessible
115 for cleaning and repairing purposes.

The object in providing each trough with a pair of openings, the first being grated, is to increase the area of the space through which the sawdust falls and thereby increase the
120 drying effect produced by the hot air passing upwardly through the same openings. The sawdust which travels over the grated opening without passing therethrough is discharged through the next opening, and thus
125 the discharge is divided between the two openings. This effect may be carried out to a greater extent, if found desirable

While the invention is admirably suited for the purpose of drying sawdust, it is obvious that it may be used for various other purposes, and it is to be understood that it is not to be limited to any particular use.

What I claim as new, and desire to secure by Letters Patent, is—

1. A drier, comprising a series of hollow troughs one above another and arranged at an incline with openings through which one may discharge into another, a conveyer passing through the troughs, and means for supplying steam to the interior of the troughs and for draining the water of condensation from the lower ends of the troughs.

2. A drier, comprising a series of hollow troughs arranged one above another and at an incline with openings through which one may discharge into another, a conveyer passing through the troughs, pipe-sections connecting the troughs together and establishing communication between the interior of the troughs, means for admitting steam to the interior of the troughs, and means at the lower end of the bottom trough for discharging water of condensation from the interior of the troughs.

3. A drier, comprising a series of troughs arranged one above another and provided with openings through which one trough may discharge into another, a conveyer passing through the troughs, the first opening of each trough passed by the conveyer being grated to allow of a partial discharge only and the next opening serving to complete the discharge, and means for heating the troughs.

4. A drier, comprising a series of troughs arranged one above another and having openings through which one may discharge into another, a conveyer passing through the troughs, means for heating the troughs, and a casing surrounding the troughs and the conveyer formed of removable sections permitting access to the several parts separately.

5. A drier, comprising a series of troughs arranged one above another and provided with openings through which one may discharge into another, a conveyer-belt passing through the troughs, valves for the openings of the first trough to control the passage of material therethrough, a bin, a projecting shelf leading from the first trough to the bin, said conveyer passing along the shelf and into the bin, and means for heating the troughs.

6. A drier, comprising a series of troughs arranged one above another and provided with openings through which one may discharge into another, a conveyer-belt passing through the troughs, valves for the openings of the first trough to control the passage of material therethrough, a bin, a projecting shelf leading from the first trough to the bin,

said conveyer passing along the shelf and into the bin, a lever pivoted in the bin, a weight connected therewith, a wheel carried by the lever around which the conveyer-belt passes, and means for heating the troughs.

7. A drier, comprising a series of troughs arranged one above another and provided with openings through which one may discharge into another, a conveyer-belt passing through the troughs, discharge-spouts leading from the openings of the last trough, valves in said spouts by means of which the discharge of material may be controlled, a hopper at the end of the last trough into which the surplus material is discharged, and means for heating the troughs.

8. A drier, comprising a series of troughs arranged one above another and provided with openings through which one may discharge into another, a conveyer-belt passing through the troughs, means for heating the troughs, a casing surrounding the troughs, and deflecting-plates on the casing leading to the bottom trough.

9. A drier, comprising a series of hollow cast-metal troughs arranged at an incline one above another and provided with openings through which one may discharge into another, pipe-sections connecting the troughs together and forming a communication between the interior of the troughs, means for admitting steam to the interior of the troughs, means for discharging water of condensation from the troughs, bearing-brackets on the ends of the troughs, sprocket-wheels journaled therein, a conveyer-belt passing around the sprocket-wheels and through the troughs and comprising a pair of chains connected at intervals by slats, means for driving the conveyer-belt, a casing surrounding the troughs, a hopper leading to the top trough, valves for the openings in the top trough, a bin, a lever pivoted therein, a weight for moving the lever, sprocket-wheels carried by the lever around which the conveyer-belt passes after leaving the top trough, a shelf projecting from the top trough to the bin to convey surplus material from the top trough to the bin, discharge-spouts leading from the openings of the bottom trough, weighted valves therein for controlling the passage through the spouts, slide-valves in the spouts, and a hopper at the end of the bottom trough to receive the surplus material after passing the spouts.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES E. SMITH.

Witnesses:

LOUIS A. PETERSEN,
Mrs. C. L. PETERSEN.